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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Linda N. Winslow

Serial No.: 10/087,028

Filed: March 1, 2002

For: DIIMINE COMPLEXES FOR OLEFIN POLYMERIZATION

Attorney Docket No.: LYON 0127 PUS

Group Art Unit: 1713

Examiner: R. Harlan

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
U.S. Patent & Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief from the final rejection of claims 12-20 of the Office Action mailed on June 16, 2004 for the above-identified patent application.

I. REAL PARTY IN INTEREST

The real party in interest is Equistar Chemical L.P. ("Assignee"), a corporation organized and existing under the laws of the state of Delaware, and having a place of business at One Houston Center, 1221 McKinney St., Houston, Texas 77010, as set forth in the assignment recorded in the U.S. Patent and Trademark Office on March 1, 2002 at Reel 012671/Frame 0428.

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this paper, including all enclosures referred to herein, is being deposited with the United States Postal Service as first-class mail, postage pre-paid, in an envelope addressed to: Mail Stop Appeal Brief - Patents, Commissioner for Patents, U.S. Patent & Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 on:

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Name of Person Signing

[Signature]  
Signature

## **II. RELATED APPEALS AND INTERFERENCES**

There are no appeals or interferences known to the Appellant, the Appellant's legal representative, or the Assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

## **III. STATUS OF CLAIMS**

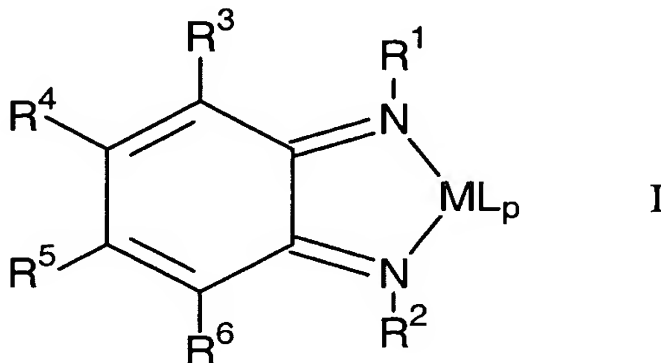
Claims 1-20 are pending in this application. Claims 12-20 have been rejected and are the subject of this appeal. Claims 1-11 have been withdrawn from consideration as directed to a non-elected invention.

## **IV. STATUS OF AMENDMENTS**

No claim amendments have been made following the final rejection of June 16, 2004.

## **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention is directed to a process of coupling at least two olefin molecules together by supplying olefin into a reactor containing a catalyst activator and a catalyst having the formula:



where

M is a metal selected from Groups 3 to 10 of the Periodic Table;

R<sup>1</sup> and R<sup>2</sup> are the same or different and are independently selected from hydrogen, C<sub>1-10</sub> alkyl, C<sub>6-10</sub> aryl, or C<sub>7-15</sub> aralkyl, each of these optionally substituted with halogen, cyano, C<sub>1-4</sub> alkoxy, or C<sub>1-4</sub> alkyl, and with the proviso that not more than 1 of R<sup>1</sup> or R<sup>2</sup> is a hydrocarbon which is branched at the imino-bonded carbon atom;

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are independently hydrogen, C<sub>1-10</sub> alkyl, C<sub>6-10</sub> aryl, C<sub>7-15</sub> aralkyl, C<sub>1-10</sub> alkoxy, or C<sub>1-10</sub> dialkylamino, each of these optionally substituted with halogen, cyano, C<sub>1-4</sub> alkoxy, or C<sub>1-4</sub> alkyl, or wherein any two adjacent R<sup>3</sup> through R<sup>6</sup> form a cyclic structure or are part of a larger ring structure, said cyclic structure and said larger ring structure optionally containing one or more heteroatoms, preferably B, N, O, S, or P;

L is a neutral or charged ligand; and

p is a integer such that complex I is neutral and the valency of M is satisfied.

(Claim 12 as filed; page 2 of the specification, line 15 to page 4, line 12; Specification page 4, line 17 to page 9).

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

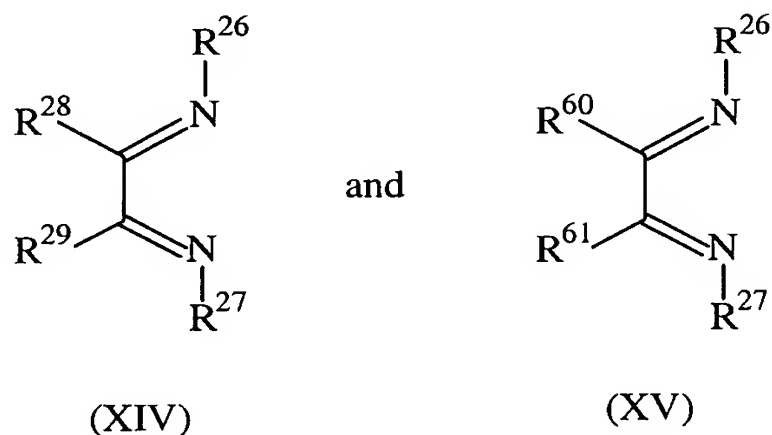
Claims 12-20 stand rejected under 35 U.S.C. § 102(a) over Hauptman PCT Publication No. WO 01/923342 ("*Hauptman*").

## **VII. ARGUMENT**

The issue in this case is relatively simple. The *Hauptman* reference discloses compounds useful as olefin polymerization catalysts. From the myriad of structures disclosed by *Hauptman*, a selection (based on Applicant's disclosure), specifically Figures 45 and 54

(page 88) which bear some resemblance to structure I of Applicant's claim 12, the only independent claim on appeal. However, in *Hauptman's* catalyst complexes, both hydrocarbon groups attached to the imino nitrogens must be branched, while in Applicant's complexes, no more than one may be branched.<sup>1</sup> Thus, *Hauptman* does not identically disclose Applicant's catalysts, necessary to sustain a rejection under 35 U.S.C. § 102(a). As the Federal Circuit has oft stated and recently reaffirmed, the test for anticipation under 35 U.S.C. § 103 is "strict identity," *i.e.*, an exact 1:1 correspondence between the disclosure of the reference and what is now claimed. *Trintec v. TOP-USA, Inc.*, 63 USPQ2d 1597 (Fed. Cir. 2002). As indicated by *Trintec*, due to the strict identity requirement of 35 U.S.C. § 102, cases of anticipation are "quite rare."

*Hauptman* discloses bis(imino)bidentate ligands at pages 30 and 31.<sup>2</sup> These structures (XIV and XV) are believed to be the only relevant ligands disclosed by *Hauptman*, and are represented below:



At issue are R<sup>26</sup>, R<sup>27</sup> and the corresponding R<sup>1</sup> and R<sup>2</sup> of Applicant's claim 12. As *Hauptman* indicates on page 31:

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<sup>1</sup> The definition of the claim phrase "hydrocarbon which is branched at the imino-bonded carbon atom" is the real issue in this case.

<sup>2</sup> *Hauptman* discloses a myriad of ligands, most of which contain phosphine groups.

R<sup>26</sup> and R<sup>27</sup> are each independently hydrocarbyl or substituted hydrocarbyl, provided that the carbon atom bonded to the imino nitrogen atom has at least two carbon atoms bound to it. (Emphasis added.)

In other words, the carbon atom bonded to the imino nitrogens for both R<sup>26</sup> and R<sup>27</sup> is a branched hydrocarbon. An example is structure 48 on page 88, where R<sup>26</sup> and R<sup>27</sup> are both aryl rings, the carbon bonded to the imino nitrogens being branched, *i.e.*, bonded to two other carbon atoms.

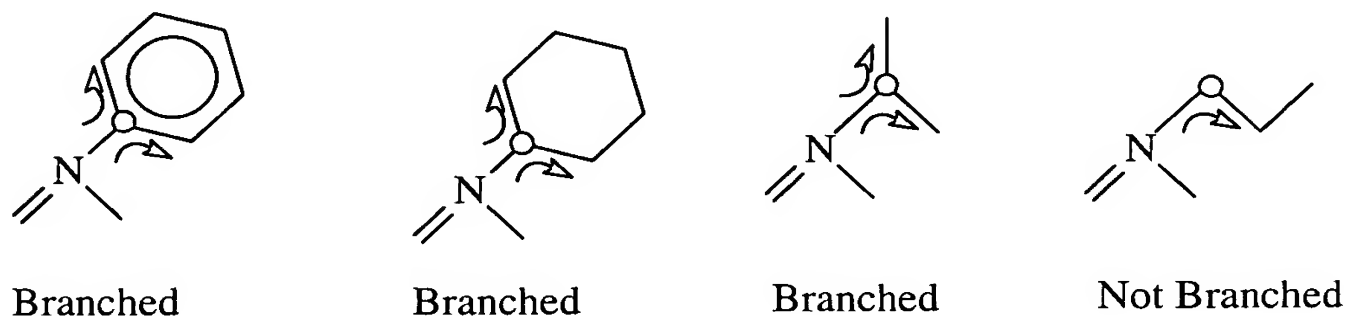
However, Applicant's claims have the specific proviso that not more than 1 of R<sup>1</sup> or R<sup>2</sup> is a hydrocarbon which is branched at the imino nitrogen. Thus, while R<sup>1</sup> and R<sup>2</sup> may be hydrogen, alkyl, aryl, or aralkyl, both R<sup>1</sup> and R<sup>2</sup> cannot be aryl, nor can R<sup>1</sup> and R<sup>2</sup> simultaneously be a secondary or tertiary alkyl group. R<sup>1</sup> and R<sup>2</sup> cannot both simultaneously be branched. This requirement distinguishes the present catalysts from those of *Hauptman*. They are not the same. Factually, *Hauptman* not only does not disclose the claimed catalysts, he actually teaches away from them, requiring both imino nitrogen substituents to be branched hydrocarbons, branched at the carbon attached to the imino nitrogen.

The Examiner takes issue with Applicant's definition of "branched at the imino-bonded carbon atom." According to the Examiner, while this definition is satisfied by branched aliphatic hydrocarbons, it is allegedly not satisfied by an aryl group (and presumably,

and incorrectly, not by a cycloaliphatic group either).<sup>3</sup> However, Applicant has challenged the Examiner's conclusory position in this regard.

The Examiner has offered absolutely no evidentiary support for the proposition that an aryl group attached to an imino nitrogen is not "a hydrocarbon . . . branched at the imino-bonded carbon atom." An aryl group is clearly a hydrocarbon, and from the carbon attached to the imino nitrogens, two other carbon atoms are attached, making the imino-bonded carbon a branch point.

The following are illustrative of branched and unbranched imino-bonded carbon atoms:



The first structure (furthest to the left), has an aryl ring bonded to the imino nitrogen. As one can clearly see, from the imino-bonded carbon atom (marked with the bold dot), two carbon atoms are attached, and two divergent paths may be taken, satisfying the chemist's 37 C.F.R. § view of branched as well as the common dictionary meaning. *See, e.g.,*

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<sup>3</sup> It is noted, for example, that in measuring solvolysis rates of primary, secondary, and tertiary hydrocarbons to determine stabilities of carbonium ions and free radicals, cycloaliphatic as well as branched aliphatic hydrocarbons are employed. *See, e.g.,* March, ADVANCED ORGANIC CHEMISTRY, "Reactions, Mechanisms, and Structure," McGraw-Hall, N.Y., © 1968; and Gould "Mechanism and Structure in Organic Chemistry", Holt, Rinehart and Winston, N.Y. 1959.

WEBSTERS NEW COLLEGIATE DICTIONARY which defines “branch” as “to spring out from” or “diverge.” It can be clearly seen that the imino carbon in any aryl group attached directly to the imino nitrogen is a branch point, and that a directly bonded aryl group, as opposed, for example to a benzyl group, is clearly branched, since two divergent paths may be taken from the point of attachment “branch point”. Such directly bonded aryl groups are thus clearly branched.

The second structure has a cycloaliphatic ring bonded to the imino nitrogen. Again, the presence of branching is clear, as it is also in the third example, which has a 2-propyl group bonded to the imino nitrogen. The fourth example, however, has a 1-propyl group bonded to the imino nitrogen, and there is no branching at the carbon bonded to the imino nitrogen; only one pathway from the bonded carbon exists, not divergent pathways.

Applicant has submitted the Rule 132 Declaration of Dr. James Proscia as evidence that under the circumstances of the present case, one skilled in the chemical arts would view an aryl group directly bonded to an imino nitrogen as being a “hydrocarbon . . . branched at the imino-bonded carbon atom.” Dr. Proscia has a Ph.D. from Harvard University, and has extensive expertise in the field of metal organic chemistry, the field to which the present catalysts belong.

The opinion of the Examiner regarding the “hydrocarbon . . . branched at the imino-bonded carbon atom” being only applicable to branched aliphatic hydrocarbons, is conclusory and has no evidentiary support. When such a conclusory statement is challenged, the burden shifts to the Office to provide evidence supportive of its position. This is too well established for argument. *See, e.g., In re Piasecki*, 223 USPQ 785 (Fed. Cir. 1984). It is also well established that a rejection based on unsupported conclusions cannot be maintained. *In re Soli*, 137 USPQ 797 (CCPA 1963); *In re Lee*, 61 USPQ 2d 1430 (Fed. Cir. 2002); *Smiths Industries Medical Systems Inc. v. Vital Signs Inc.*, 51 USPQ 2d 1415, 1421 (Fed. Cir. 1999). Here, the Office has not cited any evidence which indicates that an imino-bonded aryl group


is not "branched at the imino-bonded carbon atom", nor has it provided an affidavit by the Examiner, if based on personal knowledge, under 37 C.F.R. § 1.104(d)(2).

In view of the lack of any evidence which would support the position of the Office with regard to branching, the accepted, art-recognized definition employed by the Applicant must be adopted, and the claims must be examined on this basis. On this basis, Applicant's claims clearly prohibit complexes in which both imino nitrogen substituents are branched, while *Hauptman* requires that both substituents be branched. For these reasons, the rejection of the claims under 35 U.S.C. § 102(a) over *Hauptman* must be reversed, and reversal is therefore respectfully solicited.

The fee of \$500.00 as applicable under the provisions of 37 C.F.R. § 41.20(b)(2) is enclosed. Please charge any additional fee or credit any overpayment in connection with this filing to our Deposit Account No. 02-3978. A duplicate of this page is enclosed for this purpose.

Respectfully submitted,

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Date: January 7, 2005

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Enclosure - Appendices



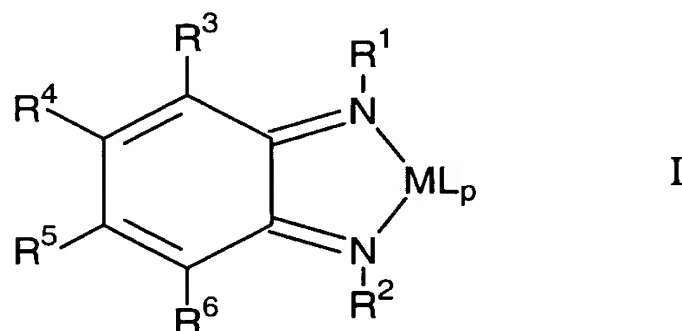
### VIII. CLAIMS APPENDIX

1 - 11. (Withdrawn)

12. A process for coupling two or more olefins, the process comprising:

1) introducing into a reaction vessel an activator and a catalyst of formula

I:



where

M is a metal selected from Groups 3 to 10 of the Periodic Table;

R<sup>1</sup> and R<sup>2</sup> are the same or different and are independently selected from hydrogen, C<sub>1-10</sub> alkyl, C<sub>6-10</sub> aryl, or C<sub>7-15</sub> aralkyl, each of these optionally substituted with halogen, cyano, C<sub>1-4</sub> alkoxy, or C<sub>1-4</sub> alkyl, and with the proviso that not more than 1 of R<sup>1</sup> or R<sup>2</sup> is a hydrocarbon which is branched at the imino-bonded carbon atom;

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are independently hydrogen, C<sub>1-10</sub> alkyl, C<sub>6-10</sub> aryl, C<sub>7-15</sub> aralkyl, C<sub>1-10</sub> alkoxy, or C<sub>1-10</sub> dialkylamino, each of these optionally substituted with halogen, cyano, C<sub>1-4</sub> alkoxy, or C<sub>1-4</sub> alkyl, or wherein

any two adjacent  $R^3$  through  $R^6$  form a cyclic structure or are part of a larger ring structure, said cyclic structure and said larger ring structure optionally containing one or more heteroatoms, preferably B, N, O, S, or P;

L is a neutral or charged ligand; and

p is a integer such that complex I is neutral and the valency of M is satisfied; and

- 2) introducing at least one olefin into the reaction vessel, wherein at least two molecules of olefin are coupled together.

13. The process of claim 12 wherein M is a metal from Groups 8 to 10 of the Periodic Table.

14. The process of claim 12 wherein M is selected from the group consisting of nickel, palladium, iron, and cobalt.

15. The process of claim 12 wherein L is a charged ligand selected from the group consisting of unsubstituted and substituted cyclopentadienyl, indenyl, fluorenyl, hydride, halide, alkyl, aryl, aralkyl, dialkylamino, siloxy, alkoxy, pyrrolyl, indolyl, carbazoyl, quinolinyl, pyridinyl, azaborolinyl, boraaryl, and mixtures thereof.

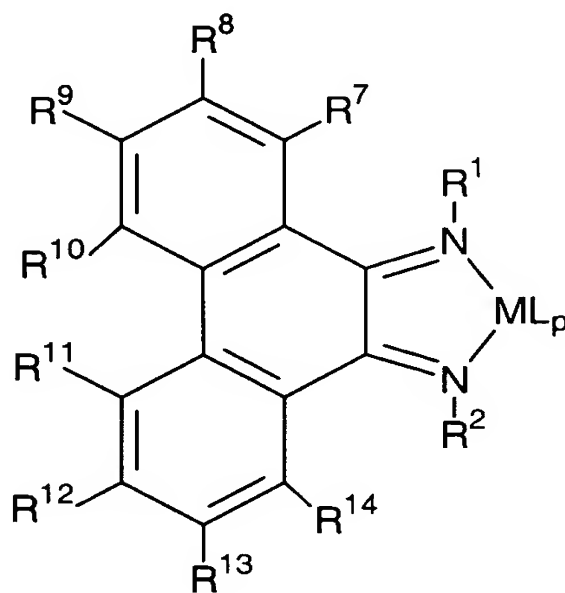
16. The process of claim 12 wherein L is a neutral ligand selected from the group consisting of carbonyl,  $\eta^6$ -aryl,  $\eta^4$ -butadiene,  $\eta^4$ -cyclobutadiene,  $\eta^4$ -cyclooctatetraene, tertiary phosphine, and mixtures thereof.

17. The process of claim 12 wherein the activator is selected from the group consisting of alumoxanes, alkylaluminum compounds, and mixtures thereof.

18. The process of claim 12 wherein the activator is an acid salt containing non-nucleophilic anions.

19. The process of claim 12 wherein the activator is selected from the group consisting of lithium tetrakis(pentafluorophenyl) borate, lithium tetrakis(pentafluorophenyl) aluminate, anilinium tetrakis(pentafluorophenyl) borate, and mixtures thereof.

20. The process of claim 12 wherein said catalyst has the formula:



where

M is a metal selected from Groups 3 to 10 of the Periodic Table;

R<sup>1</sup> and R<sup>2</sup> are the same or different and are independently selected from hydrogen, C<sub>1-10</sub> alkyl, C<sub>6-10</sub> aryl, or C<sub>7-15</sub> aralkyl, each of these optionally substituted with halogen, cyano, C<sub>1-4</sub> alkoxy, or C<sub>1-4</sub> alkyl, and with the proviso that not more than 1 of R<sup>1</sup> or R<sup>2</sup> is a hydrocarbon which is branched at the imino-bonded carbon atom;

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are independently hydrogen, C<sub>1-10</sub> alkyl, C<sub>6-10</sub> aryl, C<sub>7-15</sub> aralkyl, C<sub>1-10</sub> alkoxy, or C<sub>1-10</sub> dialkylamino, each of these optionally substituted with halogen, cyano, C<sub>1-4</sub> alkoxy, or C<sub>1-4</sub> alkyl, or wherein any two of R<sup>7</sup> through R<sup>14</sup>, or R<sup>10</sup> and R<sup>11</sup> form a cyclic structure or are part of a larger ring structure, said cyclic structure and said larger ring structure optionally containing one or more heteroatoms, preferably B, N, O, S, or P;

L is a neutral or charged ligand; and

p is a integer such that complex I is neutral and the valency of M is satisfied.

**IX. EVIDENCE APPENDIX**

**None.**

**X. RELATED PROCEEDINGS APPENDIX**

**None.**